

What Works? Success Stories in Type 2 Diabetes Mellitus

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The increasing prevalence of Type 2 diabetes mellitus has made diabetes a major public health problem worldwide. Healthcare systems are faced with the major challenge of developing innovative approaches to improving the prevention of diabetes and associated complications, particularly in populations undergoing rapid cultural development. Examples of community-based primary prevention projects in two Native communities in Canada that have high incidences of diabetes are reviewed. These projects are notable for the active participation of the communities, the collaborative relationship that was established between the communities and the researchers, and the way that traditional native culture and beliefs were incorporated into the intervention design. This phenomenon has impacted on the success of the projects and has enhanced their long-term sustainability. © 1998 John Wiley & Sons, Ltd.

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Introduction

Diabetes mellitus and its complications constitute a major health problem worldwide. The most frequent form of diabetes, Type 2 diabetes mellitus, is associated with significant vascular disease, which gives rise to considerable morbidity and mortality.¹ Furthermore, the incidence of diabetes mellitus is increasing, with an estimated 100 million people affected worldwide. By the year 2030, the incidence of diabetes is predicted to increase to over 230 million people.² Type 2 diabetes is mostly a lifestyle disorder, with the highest prevalence rates occurring in developing countries and populations undergoing 'westernization' or modernization of their lifestyle. Consequently, strategies for the prevention of diabetes and its complications need to be developed and evaluated urgently, particularly for those populations at highest risk. This paper will discuss two innovative population-based strategies for the primary prevention of diabetes and its complications currently being implemented in Native communities in Canada.

Primary Prevention

Primary prevention is recommended for populations with high prevalence rates of a disease or condition. These prevention programmes postulate that greater benefits are accrued by targeting the total population with an integrated programme rather than by attempting to screen and treat high-risk individuals.³ In this section, two such projects in Native communities in Canada are described.

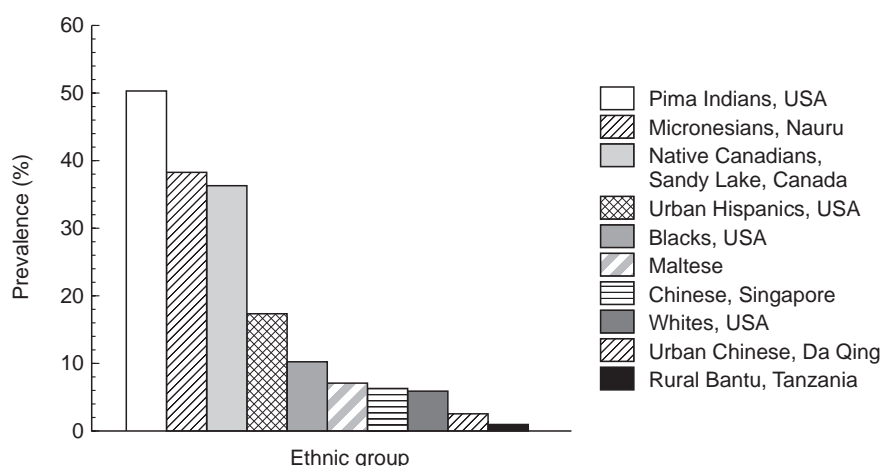
In the latter half of the 20th century, Type 2 diabetes has emerged as a major public health threat to Native populations in North America as well as in Australia and the Islands of the South Pacific (Figure 1).^{4,5} These populations have been undergoing acculturation and a rapid transition in their lifestyle; communities have moved from their traditional hunter-gatherer or agricultural-based existence to a sedentary way of life and a diet of energy-dense processed foods with high levels of saturated fat. Dietary changes and reduced levels of physical activity, which act on a susceptible genotype, are thought to be at the root of diabetes prevalence rates that range from 26–50 % in these populations.^{4–8} These groups are now experiencing high rates of age-adjusted mortality and morbidity as a result of diabetes-related complications, which include end-stage renal disease, proliferative retinopathy, lower extremity amputations and ischaemic heart disease.^{5,9} Underlining the need for primary prevention are the associated high rates of obesity, the young age of onset and the elevated rates of diabetes found in women of childbearing age.^{8,10–12}

In both examples, the analysis used emphasizes participatory research methods that are appropriate culturally. Participatory research requires collaboration between researchers and the community in which the study is being carried out.¹³ Collaboration between the two groups facilitates local input and participation by the community, and helps ensure cultural relevance and ownership of the strategy.¹⁴

The Sandy Lake Health and Diabetes Programme

The Sandy Lake Health and Diabetes Programme was initiated in 1992 to ascertain the prevalence of diabetes

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Note: Ages 30–64 standardized Segi's world population.

Figure 1. Prevalence of Type 2 diabetes in various populations (adapted from Ref. 1)

and associated risk factors in the remote Native Ojibwa-Cree community of Sandy Lake (population 1600) in Northern Ontario, Canada.¹⁵ Data collated using qualitative and quantitative survey methods were used to develop a community-based diabetes prevention or intervention programme. The prevalence rate of Type 2 diabetes was 26.1 % (age-standardized)⁸ and the diet was found to be typical of Native American populations undergoing rapid cultural change, i.e. high in saturated fat, cholesterol and simple sugars, low in dietary fibre and with a high glycaemic index.^{16,17} Physical activity levels have changed dramatically, particularly among youths with little exercise and a large amount of time spent watching television. An extensive ethnographic survey was carried out to identify local perceptions relating to health and behaviour, particularly those identified with diabetes. An ethnocentric model of diabetes was developed that identified local beliefs for risk factors and management strategies for diabetes (Figure 2).¹⁸ The programme has four main components:

- six home visits to each participating family by trained community workers to provide diabetes education that focuses on diet and exercise;
- community activities, which include weekly community-wide radio broadcast programmes, educational programmes at all community events and incentive programmes for encouraging individuals to participate in physical activity;
- grocery store tours and healthy food demonstrations;
- a school curriculum programme for grades 3–5 (ages 7–11 years) that focuses on lifelong healthy eating and exercise.

The intervention phase is now in its third year. Over a 12-month period, approximately 100 out of a total of 300 households have been enrolled. The local community leaders have played a major role in designing and providing feedback on all aspects of the programme through a formalized partnership with the investigators.

The community has participated in the study enthusiastically, as exemplified by a 72 % participation rate during the first phase.¹⁵ Outcome measures include pre- and post-intervention knowledge, levels of obesity, determination of 'stages of change', participation in intervention-related activities, anthropometric measurements (including body mass index, bioelectrical impedance analysis and skinfold thickness) and purchase patterns of food at the community grocery store. Outcome analysis is pending. As a result of this study and their consultations with the Canadian Government, the community leaders have identified diabetes as a major political and public health issue.

The Kahnawake Schools Diabetes Prevention Project

The second programme, the Kahnawake Schools Diabetes Prevention Project (KSDPP), is taking place in a Mohawk community of 6750 people outside the city of Montreal, Canada.¹⁹ The project is a three-year, community-based primary prevention intervention programme, which has targeted children at elementary schools. Preliminary findings indicated that children aged approximately 9 or 10 experienced a significant increase in body fat, which corresponded to major changes in lifestyle at the same age, with a reduction in physical activity, increased time watching television and increased consumption of junk food.¹⁹ The objectives of the project were therefore to reduce the prevalence of obesity, reduce high calorie and high fat diets, and increase physical activity among Kahnawake children aged 6–12 years over a three-year period (458 children).¹⁹ A health education programme was developed that included a new curriculum, which contained 10 lessons per year (in each school year), with sections on nutrition, fitness, diabetes and healthy lifestyles. In addition, a community-wide programme was implemented to complement the school programme,

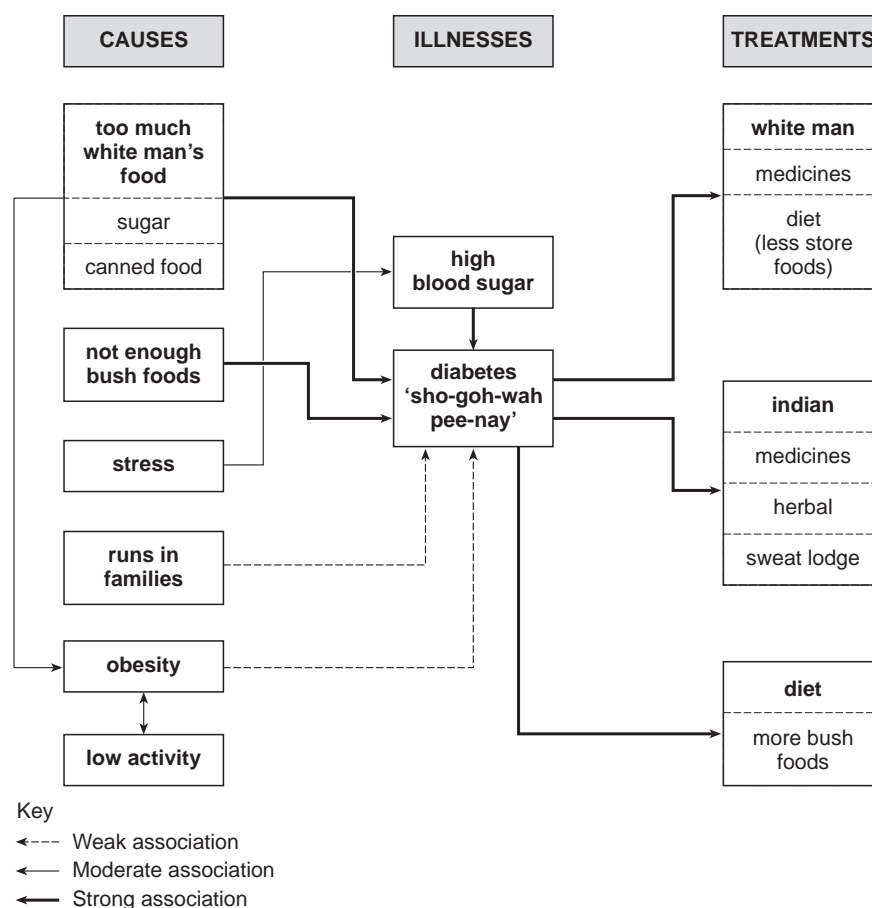


Figure 2. Ethnomedical model of *sho-goh-wah-pee-nay* (diabetes) in the study community

which targeted children, their parents, teachers, families, and the general community.

Success to date has been demonstrated by a high participation rate in the programme (87 % of the population) and, perhaps more importantly, by the fact that the community leadership has taken over the responsibility of securing funds for the continuation of the project.

The Kahnawake project and the Sandy Lake project have emphasized the incorporation of traditional native culture and beliefs, and are based on strong collaborative partnerships between researchers and the community. Collaboration has empowered the community and fostered ownership of the programme. The active participation of target communities in initiating, developing and implementing their own programmes could be considered the single most important determinant of the success and sustainability of community-based diabetes primary prevention programmes.

Conclusions

A global epidemic of Type 2 diabetes mellitus now exists and healthcare systems are faced with the challenge of developing systematic approaches to improve the management of diabetic patients, particularly in populations undergoing rapid cultural development. Examples

of community-based primary prevention projects in two Native communities in Canada with high rates of diabetes have been described. These projects were notable for the active participation of the communities and the collaborative relationship that was established between the communities and researchers. These programmes are being used as a model system by the Canadian government for the implementation of a national programme of diabetes prevention throughout the Native population of Canada.

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